ALTERNATIVES

Value analysis workshops, held in June and September of 2002, outlined urgent critical repairs that should be addressed by the proposed project. These prioritized needs are now the components of the recommended course of action, or the preferred alternative. Critical repairs are organized into two phases, with Phase 1 to be implemented in 2004, Phase 1B to be implemented in 2006 and Phase 2 to be implemented in 2005 (Project Status Report, September 2002).

ALTERNATIVE A, NO ACTION/CONTINUE CURRENT MANAGEMENT

The no action alternative describes the action of continuing the present management and conditions. It does not imply or direct discontinuing the present action or removing existing uses, development, or facilities. The no action alternative provides a basis for comparing the management direction and environmental consequences of the preferred alternative. Should the no action alternative be selected, the NPS would respond to future needs and conditions associated with stabilizing the fort without major actions or changes in the present course.

Currently, maintenance and repairs at Fort Washington are accomplished on an "as needed" basis, using the funds and staff available to implement small-scale projects. Larger-scale emergency repairs have been completed when conditions warranted immediate attention. Such emergency repairs to a substantial structural failure that occurred in 1999 at the northwest demi-bastion were completed in early 2004. The repairs included rehabilitation of the terreplein above the demi-bastion, replacing failed Portland cement mortar with lime mortar, and rehabilitating the interior and exterior façades. This three-year project included the presence of work crews numbering up to 20, occasional minor interruptions to visitation and park operations, and staging of materials on the parade ground and outside the fort.

Vegetation control and removal are performed routinely on the fort and other park structures. Maintenance and facility crews have been using hand-cutting of small plants, limited mechanized removal of larger specimens, and use of herbicides on vegetation that is not anchored in structures. To protect historic fabric, pulling plants rooted in the mortar of structures has not been used to date. The park also continues to maintain a walking trail to the gunnery on the south side of the fort by mowing and chopping sapling trees.

ALTERNATIVE B, THE PREFERRED ALTERNATIVE

The preferred alternative presents the NPS preferred alternative and defines the rationale for the action in terms of resource protection and management, visitor and operational use, costs, and other applicable factors.

The NPS has adopted the concept of sustainable design as a guiding principle of facility planning and development. The objectives of sustainability are to design park facilities to minimize adverse effects on natural and cultural values, to reflect their environmental setting, and to maintain and encourage biodiversity; to construct and retrofit facilities using energy-efficient materials and building techniques; to operate and maintain facilities to promote their sustainability; and to illustrate and promote conservation principles and practices through the sustainable design and ecologically sensitive use. Essentially, sustainability is living within the environment with the least impact on the environment. The preferred alternative subscribes to and supports the practice of sustainable planning, design, and use of Fort Washington.

Critical Repairs

The preferred alternative would entail the restoration and stabilization of a major historic structure and the surrounding grounds. It would correct the problems that have resulted from decades of neglect, improper corrective measures, and inadequate restoration funding. It would eliminate the penetration of rain, moisture, and vegetation throughout the fort surfaces and lessen the impact of further destabilization of adjoining structures (NPS 2002 Project Status Report).

The primary work that would be conducted under the preferred alternative would include the inspection, evaluation, and assessment of approximately 72,000 square feet of brickwork, 600 square feet of embankment, and 53,200 square feet of ground drainage on the parade ground. In addition, the interior and exterior of the 5,750 square foot soldiers' barracks would be stabilized and the drainage for the 7,770-square-foot officers' quarters would be repaired. This project includes replacement of the Portland cement mortar with lime mortar, stabilization of earthen embankments supporting the fort foundation, and repairs to the enlisted men's barracks and officers' quarters.

Phase 1

Locate, assess, and repair existing drainage systems throughout the fort, including gutters, downspouts, exterior and interior drains, and surface grades in the northern end of the fort. Repair damage at the main gate, including the terreplein, two slate roofs, surface drains, scuppers, and downspouts. Evaluate and restore the structural integrity of the most critically unstable fort walls at the northwest demi-bastion, northeast demi-bastion, the northeast demi-bastion terreplein, esplanade, and main gate entrance.

Replace all of the Portland cement mixture in those areas with lime mortar, including the left face, flank, and east esplanade walls. Drain moisture from the walls and repair brickwork as needed. Repair brickwork as needed in the vegetation and root eradication areas. In addition, repair the floor joints for the first floor in the enlisted men's barracks. Repair both of the slate roofs tops on the enlisted men's barracks and the officer's quarters in order to prevent any further destabilization of the walls and foundations of both structures.

Below is a list of specific actions to be carried out under Phase I.

a) Structural Repairs
    i) Repair masonry of east esplanade wall at gate house
    ii) Repair structure floor at interior of soldiers' barracks
    iii) Repair shifted stonework at gatehouse
b) Drainage Repairs
    i) Repair main gate terreplein deck
    ii) Repair main gate slate roofs
    iii) Repair northwest demi-bastion terreplein deck west and south
    iv) Repair northwest demi-bastion superior slope west and south
    v) Repair northwest demi-bastion esplanade
    vi) Repair northwest demi-bastion esplanade slope
    vii) Repair southwest demi-bastion esplanade

viii) Repair southwest demi-bastion esplanade slope

ix) Repair southwest demi-bastion drainage to river

x) Repair northeast bastion terreplein deck

c) Vegetation Removal

i) Remove vegetation at walls

ii) Remove vegetation from surface drains

iii) Remove vegetation from gun mounts

Phase 2

Partially repair the destabilized slope at the southwest demi-bastion and repair or construct drainage along the exterior of the south wall. This would include stabilization of approximately three to five acres of hillside fill that supports the southwest demi-bastion foundation by installing pilings, several hundred cubic yards of fill, several terraces, and surface drainage.

Continue stabilization of the enlisted men's barracks, including the repair and/or replacement of the four single and two double doors, 32 windows, 8-foot by 92-foot balcony, two 16-foot long staircases, and other exterior woodwork. Included with this project would be replacement of electrical, water, and waste systems, and the installation of a heating, ventilation, and air conditioning (HVAC) unit. In addition, 4,400 square feet of brickwork, including three chimneys, would be repaired.

The exterior brickwork of the officers' quarters would be stabilized and the woodwork on the front and rear porches would be repaired. Once the buildings are stabilized, repairs would be made to the electrical, heating, and plumbing systems, as well as other non-structural repairs to the interiors. The final phase of the project would include the resurfacing and seeding of the north and sound ends of the parade grounds drainage system.

d) Structural Stabilization

i) Stabilize officers' quarters exterior

ii) Stabilize soldiers' barracks exterior

iii) Stabilize soldiers' barracks interior

iv) Partially repair southwest demi-bastion slide area

e) Drainage Repairs

i) Repair officers' quarters slate roof

ii) Remove vegetation at walls

iii) Repair soldiers' barracks slate roof

iv) Repair north powder magazine and officers' quarters yard

v) Repair south powder magazine and soldiers' barracks yard

vi) Repair surface drainage outside of fort

vii) Repair caponiere surface drainage

f) Vegetation Removal

i) Remove remaining half of vegetation

Tools and Techniques

Masonry Treatment

Masonry work comprises the bulk of the work to be accomplished on the fort. The stabilization needs vary from simple repointing (replacing mortar) to dismantling, removing, and resetting of existing loose stones and brick to replacement of missing stones and brick. All mortar in the designated project area would be replaced with lime mortar, formulated to conform to historic mortar performance (Lewis & Zimmerman 2002).

Removal of masonry, brick, and stone would be accomplished using hand tools, and, because of the quantity of work and hardness of Portland cement, power tools would likely be used. Tool types to be used would include specialized hand-held masonry chisels and hammers and common power tools. Utmost care shall be taken to not damage brick and stone and to retain, to the greatest extent possible, the character of the fort (Marsh, personal communication 2004). An extensive scaffolding system would be used to provide access to repair sites on both the interior and exterior of the fort.

Drainage System Repairs

The roofs and individual downspouts of several interior structures (see listing above) would be replaced and/or repaired to better convey rain and snowmelt from the buildings to the centralized stormwater management system. The storm drain system would be cleaned out and repaired. This would help preserve the system and improve overall drainage function. Deteriorated or inoperable system components would be replaced with suitable materials. These actions would largely be accomplished with hand tools, but large equipment could be used in the parade ground and outside the fort walls.

Soldiers' Barracks and Other Interior Spaces

Surveys and sampling to identify, characterize, and quantify the nature of the hazardous substances present in work areas and the extent that these materials would be disturbed would be conducted. The primary hazardous substances of concern in Fort Washington are lead and asbestos. If these substances are found among the materials to be demolished and removed, an abatement plan would be developed to address appropriate removal, handling, and disposal of these substances (see Public Health and Safety).

Vegetation Removal

Vegetation on the fort would be removed using different methods, depending on the condition of the structure at the particular location. In areas were walls are intact, the tree trunks would be cut flush down to the face of the wall and poison spikes inserted in the remaining stump to permanently stop future growth of the tree. At locations where walls are already damaged, the tree and its roots would be fully removed, the growth area poisoned, and the walls rebuilt.

Outside the fort, on slopes above the river, 3 to 5 acres of scrubby trees and shrubs and would be removed and the slope stabilized. Grading and/or terraces would be used to provide increased protection from erosion and slumping. This work would be accomplished using site preparation and equipment commonly seen at construction sites: graders, scrapers, front-end loaders, and dump trucks.

The slope would be revegetated with plant materials selected for increased stability and suitability for inclusion in a historic landscape. A range of plant types, from grasses to shrubs and trees, could be

included on the site. Specific species selection would be made by NPS staff and consulting landscape architects and historical architects.

Access and Operations

The stabilization project is scheduled to last approximately three years. During that time, contracted work crews of 20 or more would be onsite in most weather conditions. It is anticipated that the contractor would use space in the officers' quarters building for operations. By using this space, no trailer is brought to the park, the crew has access to a restroom facility, and electric and phone infrastructure does not need to be brought in by cable. The park provided this space to the northwest demi-bastion contractor, and it worked well for the park and contractor.

Large quantities of construction materials would be delivered to and moved within the park. Materials stored on-site would include mortar components, sand, brick, stone, fill dirt, and a variety of construction equipment. Large and small equipment would be operated inside and outside the fort, and large quantities of construction materials would be stored in the staging area adjacent to the fort. The lighthouse access road along the river may need temporary improvements to the asphalt surface for construction traffic, and equipment and materials would be moved along the road between the visitor center and the fort for daily use.

During repair of the main gate, scaffolding would be in place to protect against falling debris. Repairs at this location could take one to four months. During that time, the gate would be closed, and visitors would not have access to the interior of the fort. In addition, the park does not plan to have materials delivered at times when the public is entering or exiting the main gate.

A summary table comparing the environmental consequences of each alternative is presented at the end of the alternatives section.

Archeological Resources Monitoring

Archeological investigation and monitoring would be conducted during the structural work performed on the soldiers' barracks to locate and collect artifacts from the excavated areas. Investigation and monitoring would also be done in the northwest demi-bastion esplanade during drainage system repairs. An archeological investigation of the proposed staging area would also be undertaken, if deemed appropriate. The archeological work would be coordinated with architectural consultants and would be conducted as appropriate prior to or in conjunction with proposed construction activities.

THE ENVIRONMENTALLY PREFERRED ALTERNATIVE

The environmentally preferred alternative is the alternative that will best promote the national environmental policy expressed in the National Environmental Policy Act. The environmentally preferred alternative would cause the least damage to the biological and physical environment, and would best protect, preserve, and enhance historic, cultural, and natural resources.

Section 101(b) of the National Environmental Policy Act identifies six criteria to help determine the environmentally preferred alternative. The act directs that federal plans should:

1. Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.
2. Assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings.

3. Attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences.

4. Preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment that supports diversity, and variety of individual choice.

5. Achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities.

6. Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

The environmentally preferred alternative for the Fort Washington stabilization project was identified by applying these national environmental policy goals to the evaluation and decision-making processes.

Alternative A, the No Action Alternative, fails to meet these criteria because it *does not*:

> Protect the important historical resources of Fort Washington for enjoyment by future generations (Criteria 1 and 4);
>
> Retain the integrity of the fort and its appearance as a nationally significant historic and cultural resource (Criterion 3); or
>
> Improve of enhance public and employee health and safety (Criterion 2).

Therefore, Alternative A is not the environmentally preferred alternative.

Alternative B, the Preferred Alternative, would attain the widest range of beneficial uses of the environment, visitor safety and enjoyment, and cultural resource protection, without degradation of resources. Specifically, Alternative B meets the criteria for the environmentally preferred alternative because it would:

> Provide a long-term strategy for preserving the cultural fabric of this nationally significant cultural resource (Criteria 1, 2, and 4);
>
> Reduce the health and safety risks to the visiting public and park staff, eliminating unsafe conditions associated with weakened and unsafe structural conditions (Criteria 2 and 3);
>
> Retain the visual integrity of the fort, through repair of the scarp and removal of vegetation, by stabilizing the adjacent slope, and by restoring the type of vegetation associated with the use of the structure as a defense fortification (Criteria 3 and 4); and
>
> Provide for a wider range of visitor use and interpretation, while ensuring the preservation of this 19th century fort (Criteria 3 and 5).

Therefore, Alternative B is the environmentally preferred alternative.

STAGING AREA

The mortar, sand, brick, and stone required to complete this project would be brought in from outside the park and stored onsite prior to use. The staging area for this project (storage for material, equipment, etc.) would be a previously disturbed area near the Diggs Point Light House. It is presently used a military installation under a Memorandum of Agreement between the National Park Service and the military.

In addition, limited quantities of materials needed for one or more day's work would be transported from the staging area to inside the fort. These materials would be temporarily placed on the parade ground for

use, and replenished when exhausted. The materials would be brought through the main gate by hand cart, wheelbarrow, or by truck.

In addition, limited quantities of materials needed for one or more day's work would be transported from the staging area to inside the fort. These materials would be temporarily placed on the parade ground for use, and replenished when exhausted. The materials would be brought through the main gate by hand cart, wheelbarrow, or by truck.

MITIGATION MEASURES OF THE PREFERRED ALTERNATIVE

The best management practices and resource protection measures would include, but are not strictly limited to:

Practices to Minimize Effects on Cultural Resources

All phases of the repair and rehabilitation would be in compliance with the Secretary of the Interior's *Guidelines for the Treatment of Historic Properties and Cultural Landscape.*

All work would comply with the substantive and procedural requirements described in the Secretary of the Interior's *Standards and Guidelines for Archeology and Historic Preservation*, Director's Order 28, and other management tools.

If not already accomplished, extant historic structural elements that require reconstruction or restoration would be documented as called for in the Secretary of the Interior's Standards for the Treatment of Historic Properties (NPS 1995b) prior to any disassembly.

Replacement bricks would match the historic brick in size, color, texture, porosity and other characteristics. To ensure that replacement bricks match the color of the original bricks, extensive brick samples would be taken to represent the full color range of historic bricks and to replicate the historic variations in color, avoiding an inaccurate monochromatic appearance. Multiple samples would be taken. Additional sampling in other areas of the fort would occur to ensure that the visual integrity of the fort is preserved through the use of bricks that match the historic appearance of the fort.

All mortar would be replaced with lime mortar formulated to conform to historic mortar performance.

All repair or restoration of exterior wood, doors, windows and balconies associated with the soldiers' barracks and the officers' quarters would be accomplished using architecturally compatible materials and original styles.

All repairs to the slate roofs for the main gate, soldiers' barracks, and the officers' quarters would be accomplished using slate materials and designs that preserve the style and appearance of the originals.

Vegetation encroaching on or growing into historic walls, foundations, or walkways would be carefully cut away at ground level or at the surface of a structure, using hand-tools and materials and techniques designed to prevent damage to structural elements, architectural collapse or further degradation of masonry features. Treatment of soils and vegetation adjacent to the wall segments would be designed to minimize re-growth of trees, shrubs and vines while providing ground cover to prevent erosion. Further treatment would follow National Park Service's guidance.

Areas known to contain sensitive cultural resources would be identified in the construction operations plan; work limits would be established and clearly marked to protect resources; and all protection measures would be clearly stated in the construction specifications. Workers would be instructed to avoid

conducting activities beyond the construction zone and their compliance monitored by the project Contracting Officers' Technical Representative.

To minimize ground disturbance, staging areas, materials stockpiling, vehicle storage, and other construction-related facilities and areas would be located in a previously disturbed area or on hardened surfaces. Mortar would be mixed at the staging areas and transported to the areas under construction.

Archeological investigations would be conducted on the soldiers' barracks during the structural evaluation of the stone foundation to identify any domestic or military artifacts related to occupation of the barracks. Construction in areas adjacent to cannons would be monitored to ensure their protection.

An archeological investigation would be conducted on the 2 to 3 acre staging area to the west and southwest of the fort, adjacent to the ravelin, prior to placement of construction materials or equipment, as appropriate.

Archeological monitoring would be conducted in all areas with known and suspected archeological resources, including excavation of the fort walls during stabilization. Work limits would be established and clearly marked, and workers would be instructed to stay within work limits.

Archeological monitoring would be conducted at the site of any ground disturbance in currently inaccessible paved areas or areas beneath and adjacent to existing structures (walkways, steps, flooring, drains, etc.).

Construction documents would include stop-work provisions, should archeological resources be uncovered, and the contractor would be apprised of these protective measures during the pre-construction conference. Construction documents also would include specific line item provisions to give the monitoring archeologist the authority to request temporary construction delays or temporary shifts of construction equipment to another location.

Potential ground-disturbing activities such grading, drainage modifications, and structural wall and foundation rehabilitation would be carefully planned because these areas may harbor presently unknown archeological resources. Previous archeological work would be reviewed to help identify potential resources. An archeologist meeting the Secretary of the Interior's Standards would monitor construction in these and other areas known or suspected to have archeological resources, including excavation of the fort walls during stabilization.

To reduce unauthorized collecting, construction personnel would be educated about the need to protect any cultural resources at the site, about how to protect any archeological resources inadvertently discovered during construction, and about the illegality of collecting or removing artifacts. They would be give specific instructions about stopping construction work, protecting remains from further disturbance, and immediately notifying park personnel if human remains are found.

Work crews would be instructed regarding the illegality of collecting artifacts on federal lands to avoid any potential Archeological Resources Protection Act violations. This would include instructions for notifying appropriate personnel if human remains were discovered. Information would be provided to ensure necessary precautions when working around museum objects within the project area.

Excavation of original drains, drainage channels lines, wells and cisterns located in the southwest and northwest demi-bastions would be phased. In Phase 1, overlying fill soils would be carefully removed as part of the initial grading process to expose features of the underlying drains, wells, and other features. Construction activities would then be temporarily relocated to another area so the original materials and configurations of newly uncovered features could be documented, their National Register eligibility evaluated, and any Section 106 compliance, as appropriate, completed prior to resumption of Phase 2, final grading.

An alternative non-damaging, safe, and protective method would be used to remove and replace brick, masonry, coping stones, and mortar. Extensive brick samples would be taken to ensure a match in the appearance of replacement bricks. Prior to disassembly, extant historic structural elements that require reconstruction or restoration would be documented.

All mortar would be replaced with lime mortar formulated to conform to historic mortar performance.

All removal of vegetation and treatment of soils would be done with hand-tools, to minimize damage to adjacent structures.

As much of the original historic fabric as possible would be preserved or left undisturbed once all safety factors and structural stabilization requirements are met.

All repair or restoration of exterior wood, doors, windows and balconies associated with the soldiers' barracks and the officers' quarters, as well as all slate roofs, would be accomplished using architecturally compatible materials and original styles.

Geotextile/rubber matting would be installed to protect the masonry pavement entryway through the gatehouse from heavy equipment and construction traffic.

Construction materials, dumpster(s), and staging areas would be situated in previously disturbed/hard-surfaced areas exterior to the fort.

Construction of temporary scaffolding and protective cover over the gatehouse and portions of the terreplein would help protect the historic structures and potential archeological resources.

Installation of geotextile fabric under the ceiling would help prevent damage to surrounding walls, surfaces, and flooring.

Landscaped areas disturbed by restoration and rehabilitation would be revegetated with grass and landscape plantings and other landscape elements as appropriate. The types and locations of replacement vegetation would be carefully chosen to, where possible, replicate historic elements of the cultural landscape while avoiding introduction of problem exotic plants.

Practices to Minimize Effects on Visitor Experience and Public Health and Safety

The park would continue to monitor and close off sections of the fort to visitor and park staff access where deterioration and/or stabilization repair activities would represent a potential hazard to public health and safety.

Stabilization activities would be scheduled with the contractor to minimize conflict with visitor use in and around the fort. Movement of large quantities of materials to and from staging areas would be scheduled and designed to minimize conflicts between the contractor, visitors, and routine park operations.

Where appropriate, activities conducted in the fort's interior rooms and spaces would be guided by a lead abatement investigation and removal plan. This plan would be compliant with all federal, state, and local requirements in accordance with Title 15, Chapter 53, subchapter IV Section 2688 – Control of Lead-based Paint Hazards at Federal Facilities and the Occupational Safety & Health Administration standard for construction (29 Code of Federal Regulations 1926.62). In addition, if necessary, an asbestos investigation and removal plan would be developed in accordance with Occupational Safety & Health Administration standards (29 Code of Federal Regulations 1926.ll0l).

Where appropriate, activities conducted in the fort's interior rooms and spaces would be guided by an asbestos investigation and removal plan. This plan would be compliant with all federal, state, and local requirements and in accordance with Occupational Safety and Health standards pertaining to employee or

worker exposure covered under 29 CFR 1910.1001. Additional work practices would comply with the Construction Standard for the Asbestos Industry (40 CFR 1926.1101 or CFR Title 8 Section 1529).

Practices to Minimize Effects on Park Operations

By providing adequate training and orientation for stabilization personnel, the park would be better able to reduce the burden of managing and monitoring stabilization work associated with the current management operation. Training and monitoring of stabilization personnel would also lessen the adverse effects of stabilization activities on visitor use and experience.

The contractor would be required to schedule activities in consultation with park staff to minimize conflicts with daily park operations and other park projects.

The contractor would be required to use "green" technologies for utility support to reduce impacts on the park's utility system and resources.

Increased efforts to have partners, local communities, and volunteer organizations assist in reducing some of the routine park-wide maintenance activities, as well as assisting in performing non-technical maintenance on the fort would increase the park's ability to meet its operational needs.

Practices to Minimize Effects on Soils, Vegetation, and Water Resources

When preliminary design concepts are developed for proposed repairs, evaluation would be performed to determine the need to prepare an erosion and sediment control and stormwater management plan in compliance with the General Discharge Permit Application for Construction Activities. If deemed necessary, repair of all drainage structures and components would comply with Joint Federal/State Applications for the Alteration of Any Tidal Wetland or Any Floodplain, Waterway, Tidal or Non-tidal Wetland in Maryland.

Standard erosion control best management practices, including silt fencing, would be used at sand stockpiles to control sediment generation and transport. Construction and contractor billeting activities would be contained within designated boundaries to reduce effects on vegetation. Upon completion of the project, highly disturbed areas would be restored, which could include soil preparation and reseeding with native vegetation.

Compliance would be maintained with all local land use, zoning, development review, and building permit requirements protecting historic or cultural areas such as the Broad Creek Historic District and environmental features such as the Chesapeake Bay Critical Area and 100-year floodplain requirements for Prince George's County, Maryland.

The contractor would be required to submit erosion control and stormwater management plans as specified in the 1994 *Maryland Standards and Specifications for Soil Erosion and Sediment Control* and in the 2000 *Maryland Storm Water Design Manual, Volumes I and II* (Clevanger, personal communication 2004).

Practices to Minimize Effects on the Natural Soundscape

To allow a period of time when natural sounds predominate and human-caused noise is low, no construction equipment would be operated between sunset and sunrise. Use of generators at the contractor camp or at contractor billeting boats moored near Garden Key would be restricted between 11:00 p.m. and 6:00 a.m. Cessation of construction and stabilization activities at night would allow wildlife to move freely and forage in the areas near the project without disturbance.

Acoustical shrouds would be required to reduce the level of noise from air compressors. The use of barriers and enclosures can reduce equipment noise levels by approximately 10 decibels (NIOSH 1978).

Workers would be trained to be sensitive to park resources, including the natural soundscape.

Contractor and visitor contact would be minimized by designating specific sites for the contractor's camp and activities, and for the storage of contractor equipment and materials. Work areas would be delineated, and access by visitors and non-essential park staff would be prohibited.

GENERAL CONSTRUCTION SCHEDULE AND COSTS

The project status report (NPS 2002) estimates that the completion of Phases 1 and 2 would be accomplished between September 2004 and June 2007 (Phase 1A would be implemented in 2004, Phase 1B would be implemented in 2006 and Phase 2 in 2005). The estimated total design and construction cost for the stabilization project is $10 million.

ALTERNATIVES CONSIDERED BUT DISMISSED

Maintain the Fort as a Ruin

The option of abandoning all rehabilitation efforts, including the routine repairs that occur under current management, was considered and rejected. Under this alternative, the effects of climate and vegetation encroachment would be allowed to take their toll on the structure. Deterioration of historic fabric would likely occur very rapidly, and portions of the fort would become structurally unsound and fail. This option did not meet the park's legislative mandate to preserve and interpret the nation's coastal defense system because it would eventually lead to loss of the resource.

Restore the Fort to a Specific Historic Period

Because Fort Washington was used continuously through many historic periods, the suggestion was made to select a specific era and restore the fort consistent with its function and appearance during that time (e.g., the Civil War). Complete restoration of the fort to a particular period would require demolition and removal of features constructed in other periods. This would diminish the cultural and interpretive value of the fort, and did not meet the legislative mandate or conform to management objectives. Because it is important to exhibit historic coastal defense systems at Fort Washington spanning 1815 to 1920, this option was rejected.

ALTERNATIVE AND ENVIRONMENTAL IMPACTS COMPARISON TABLES

The following table (Table 1) shows the ability of the two alternatives to meet the project objectives. This provides a way to quickly compare and contrast the degree to which each alternative accomplishes the project purpose of fulfills the need identified in the Purpose and Need section, above. Table 2 shows the summary of environmental effects for each alternative, for each impact topic.

TABLE 1. OBJECTIVES AND THE ABILITY OF THE ALTERNATIVES TO MEET THEM

Objective	Alternative A, No Action/Continue Current Management	Alternative B, the Preferred Alternative
Prevent the loss of valuable historic resources by providing long-term remedies for damage caused by the inadequacy of the fort's drainage system and ongoing vegetation encroachment	Under current management, emergency repairs would be used to address immediate needs. This would not result in long-term protection of historic fabric and features. Therefore, Alternative A does not meet this objective.	The preferred alternative addresses critical and urgent structural needs as outlined in the 1982 Historic Structures Report and as identified at the 2002 Value Analysis Workshops. This option includes use of historic and modern technologies that would result in effective repairs designed to last a century, rather than decades. Therefore, the preferred alternative meets this objective.
Comply with the park's mandate to protect and interpret this portion of the American Coastal Defense system	Over the short-term, the park would continue to meet its legislated mandate. However, over the long-term, as the fort deteriorates, important character-defining features could be lost. In addition, the majority of the fort is now inaccessible due to safety concerns, and features in closed areas must be interpreted from a distance, or left unmentioned. Therefore, the no action alternative does not meet this objective.	During project implementation, visitors may experience an increase in closures and temporarily have limited access to the fort. Upon completion, this alternative would meet the objective by providing long-term protection of historic resources, and by allowing a greater percentage of the fort to be accessed for visitation and interpretation.
Protect and enhance public and employee health, safety, and welfare	Currently, about 60 percent of the fort is closed to visitors due to unsafe conditions. Park staff must be wary when performing regular maintenance activities and vegetation removal at locations where loose bricks could fall, slumping banks may fail, and walls could collapse. Without a coordinated effort to address these structural problems, the situation is not likely to improve. Therefore, the no action alternative does not meet this objective.	During project implementation, additional areas of the fort would be closed to access, and signage and fencing would be used to protect staff and visitors from construction hazards. In addition, lead and asbestos abatement plans would be developed to secure worker safety. Once complete, the project would yield long-term benefits to public and staff safety by stabilizing unsafe areas of the fort's interior and exterior. Therefore, the preferred alternative meets the objective.
Improve the efficiency of park operations	Under current management park staff are fully utilized to perform maintenance and vegetation control, and the fort's condition continues to worsen. This alternative does not meet this objective.	Under the preferred alternative, there would be short-term adverse effects to park operations during implementation. These effects would be mitigated by coordination of contractor and staff efforts. Over the long-term, park operations would benefit from increased structural stability, reduced water intrusion, and fewer emergency repairs. This option meets the long-term goal of improving the efficiency of park operations.

TABLE 2. SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Impact Topic	Alternative A, No Action/Continue Current Management	Alternative B, the Preferred Alternative
Cultural Resources		
Archeological Resources	Archeological resources would continue to be degraded by vegetation growth and the lack of proper drainage, and would continue to lose physical integrity. This would result in moderate, long-term, adverse effects for archeological resources.	Some archeological resources would be disturbed, and others could be destroyed during project implementation. However, drainage corrections and vegetation control would help protect archeological resources from future damage. Overall, Alternative B would result in minor to moderate, long-term, adverse effects for archeological resources, although some resources would gain minor benefits.
Historic Structures	Under Alternative A repairs would not compensate for the moderate, long-term, adverse effects created by deterioration of historic fabric, and work would have to be repeated frequently. Repair work would have a short-term, minor to moderate, beneficial effect, but inadequate drainage and vegetation would continue to adversely affect historic structures.	Fort stabilization and rehabilitation efforts of Alternative B would prevent additional loss of historic fabric, and would result moderate long-term benefits. Removal of vegetation from walls could have minor, short-term adverse impacts on structures. However, the long-term result would be improved preservation, a moderate beneficial effect.
Cultural Landscape	As deterioration continues to outpace repair efforts, the cultural landscape would experience moderate, long-term, adverse effects. The short-term adverse effects on the cultural landscape caused by annual construction activities would be minor.	Rehabilitation of the contributing elements of the Fort Washington Historic District and removal of trees from adjacent slopes would help protect the integrity of the cultural landscape. This would result in a moderate, long-term beneficial effect. The presence of construction materials and equipment would create visual intrusions resulting in minor, short-term adverse effects.
Museum Collections	Inadvertent damage to *in situ* objects (i.e., cannons) and increased access to archeological sites during construction would result in minor, long-term, adverse effects for museum collections.	Inadvertent damage to *in situ* objects (i.e., cannons) and increased access to archeological sites during construction would result in minor, long-term, adverse effects for museum collections.
Visitor Experience and Public Health and Safety	Continuation of current management would result in negligible to moderate, short-term, adverse effects to the visitor experience and safety because of the fort closures caused by the level of deterioration. In the long-term, fort deterioration would be expected to increase and would result in long-term, minor to moderate, adverse impacts due to increased hazards and closures.	In the short-term, the preferred alternative would have a negligible to minor, adverse effect on visitor experience and safety because of the demolition and construction activities, the increased number of closures in during the stabilization effort. Over the long term, this stabilization project would have minor to moderate benefits because unsafe conditions now associated with the fort's deterioration would be alleviated or minimized, and visitor access improved.

TABLE 2. SUMMARY OF ENVIRONMENTAL CONSEQUENCES (CONTINUED)

Impact Topic	Alternative A, No Action/Continue Current Management	Alternative B, the Preferred Alternative
Park Operations	Increasing deterioration of the fort would have minor, short-term, adverse effects and moderate, long-term, adverse effects on park operations. Facilities and maintenance responsibilities for repair and vegetation removal would increase over time.	In the short-term, the Preferred Alternative would have negligible to moderate, adverse effects on park operations by adding monitoring tasks. Over the long-term, park operations would experience minor to moderate, benefits as emergency repairs are reduced, and the structure is better maintained with normal staffing levels and budgets.
Vegetation	Ground disturbance and vegetation removal associated with Alternative A would produce long-term, negligible, adverse effects on vegetation.	Impacts to vegetation associated with Alternative B would be short- and long-term, minor, and both beneficial and adverse. These impacts would result from repair and maintenance operations at Fort Washington and its parade ground, and removal of vegetation from the fort walls and slopes west of the fort.
Soils	Ongoing maintenance and repair activities would have adverse, negligible to minor, long-term impacts to soils. Continued soil slumping and landslides on slopes surrounding the fort would have a long-term, minor, adverse impact on soils.	Ground disturbance during project implementation would have short-term, minor, adverse impacts to soils. Vegetation removal from the slopes would result in short-term, minor, adverse impacts. However, revegetation and grading would result in long-term, minor, beneficial impacts to soils.
Wildlife	Routine maintenance and repairs would have no effect on wildlife or habitat. In the event of large-scale emergency repairs, localized, short-term, negligible to minor, adverse effects would occur as wildlife avoids the project area.	Alternative B would have local, short-term, minor, adverse impacts on wildlife. Species temporarily disturbed by project activities would likely flee the general area.
Water Quality	Under the no action alternative, emergency repairs could produce short-term, localized, negligible to minor, adverse effects to water quality. These would result if heavy precipitation carried sediment into the nearby waterways.	Implementation of the Preferred Alternative would result in localized, short-term, negligible to minor, adverse effects to water quality. Detectable turbidity and sediment near the shore would be anticipated only from heavy precipitation events.